

REMARKS

Applicants gratefully acknowledge that the Examiner has found the arguments presented as to the earlier prior art rejections to be persuasive. Applicants also gratefully note that the Examiner has found patentable subject matter in all the pending claims Nos. 1-25 and 27-33.

As to the §112 rejections and objections, applicant has amended Fig. 1 of the drawing to show the reflected light beam 9 as reaching the light receiving means 4, and has amended claims 1, 4, 9, 10, 12, 13, 17, 19, 20, 25, 27-29 and 33 to delete clear errors, include express definitions of symbols, and provide clear antecedent bases.

With these amendments and the following remarks responsive to the Examiner's objection to the specification, (para. 2), the claims (para 3-18), and rejections of claims 19, 27 and 33 (para. 20), applicant is of the opinion that the application is clear and in condition for allowance.

Objections To the Specification

The Examiner questions whether the specification provides a proper antecedent basis for the limitation $\beta/\pi = n$ or $n + \frac{1}{2}$ as it appears in claims 4 and 13. The specification at page 6, line 17 provides an exact antecedent basis for this limitation.

The Examiner next questions whether the specification provides an antecedent basis for the element "a rotational light-receiving means" in apparatus claim 27 and the analog element, "a rotational light receiving step", in method claim 19. These elements relate to means/step for 1) adjusting the difference between the angular position ϕ of the transmission axis of the first

polarizer 2 and the angular position ϕ' of the second polarizer 3, as well as 2) their relation to the alignment direction of the orientation film as the entrance substrate, the X axis 25 in Fig. 2. Rotation of the polarizers, as noted at the cited passage on page 32, provides this rotation light-receiving, as does rotation of the stage 7 mounting the liquid crystal cell 101, also as discussed on page 32, bottom, and is shown in Fig. 1. The rotational light-receiving mean/step is a separate element from the "light-receiving" means and step of claims 27 and 19, respectively.

The specification at pages 32-33 describing the use of monochromatic light and not using a spectroscope relates to the light-receiving component 4, not a rotation of the polarizers or the stage 7. Further, this light-receiving component is shown in Fig. 1 as a functional box. In the embodiments using white light, a spectroscope is used in the light receiver 4, as described. When monochromatic light is used, a spectroscope per se is superfluous, and, as stated on pages 32-33, not used.

However, the light-receiving functional box 4 without a spectroscope has a functional role. As shown and described, it is connected to "an electronic computer 5" (page 17, lines 31-32). Therefore box 4 functions to convert information carried by the input light beam 9 into an electrical output signal suitable for electronic computing. Even if monochromatic light is used, and a spectroscope per se is not used, the light-receiving component 4 still performs this optical-to-electrical conversion. The specification and drawings therefore, in fact, support embodiments and claims (e.g. 19 and 27) using white light and

a spectroscope, as well as embodiments using monochromatic light and no spectroscope – as described on pages 32-33.

Also, in view of these comments, no amendment of the drawings is considered necessary to illustrate the embodiment of claims 27-33.

These comments, supplemented by the following remarks, are also believed to clarify any ambiguity as to claims 10, 19, and 27, particularly with respect of the use of white or monochromatic light.

Objections to the Claims

In claim 1, amendments have been made to address the points raised by the Examiner. “Birefringent” is now correctly spelled. “Light receiving means” in line 12 is changed to “light-receiving step” to have a clear method claim antecedent basis. The term “returns” in line 15 is clarified in that the “reflected light” that “returns” is reflected from “the reflection region” specified in the preamble. In line 16, “said entering” is now “said light entering”. In line 24, “d” is preceded by “the thickness”, referring to “a thickness d” in line 1.

In Line 8, the first polarizing means is stated as having a “transmission axis” to provide an antecedent basis for this phrase in claim 7, which is therefore not amended.

Claims 4 and 13 are amended to express the equation for α (Equation 1) in a different, equivalent form, and to be consistent with the specification as amended on pages 6 and 8.

Claim 9 is amended to define a “light-receiving step” with a clear antecedent basis in claim 1.

Claim 10 has also been amended as suggested by the Examiner, to provide clearer antecedent bases for language used in dependent claims, and to define terms more clearly. In line 1, the measured thickness is specified as “d” and being that of a liquid crystal layer of a device. In line 3, the first polarizer is defined as having a transmission axis. In line 13, “said entering” is specified as “said light entering” the device. In line 12, as in claim 1, “returns” has been specified as the reflected light that returns at an object to be measured (e.g. the light reflected from reflector 15 and propagation through a liquid crystal layer). “d” is specified in line 1 as the thickness being measured. “ Δn ” is specified as the birefringent index of the liquid crystal layer. “ $\Delta n \cdot d$ ” is specified as the product of Δn and d.

Claim 12 is amended to “matrix is used by” as requested by the Examiner.

Claim 16 is not amended, as amendments in claim 10 from which it depends provide a clear antecedent basis for “the transmission axis” and “said liquid crystal layer”.

Claim 17 is amended to define “said $\Delta n \cdot d$ deriving step” as a “ $\Delta n \cdot d$ deriving means” to provide a clear antecedent basis for this means in apparatus claim 10.

Claim 18 is amended to define “said entering” as “said light entering”. An antecedent basis for “reflection region” is now found in claim 10.

Claim 19 is amended to correctly spell “birefringent”. In the angle deriving step, “returns” is specified as “returns from the reflection region” and

“said entering” is specified, as suggested by the Examiner, as “said light entering”. In line 26, the desired wavelength is now defined as the monochromatic light wavelength specified earlier in claim 19, at line 7.

Claim 20 is amended to provide a clearer antecedent basis for “said reflected light intensity”.

Claim 25 corrects “light-receiving means” to “light-receiving step” consistent with antecedent method claim 19, and specifies “said entering” as “said light entering”.

Amendments in claims 27 address the objections to “said entering”, “returns”, and the terms “d”, “ Δn ”, and “ $\Delta n \cdot d$ ”.

Claim 28 is amended like claim 20 to restate the phrase “said reflected light intensity”.

Claim 29 is amended like claim 12 to read “matrix is used by”.

“Light entering” now appears in claim 33. Claim 27 as amended provides an antecedent basis for “said crystal liquid device”.

Claim Rejection

Applicant respectfully traverses the rejection of now amended claims 19, 27, and 33 under 35 U.S.C. 112, second paragraph, as being indefinite or failing to particularly point out and distinctly claim the subject matter of the present invention.

With respect to claims 19 and 27, as noted above at the outset of applicant’s Remarks on Objections to the Specification, the light receiving step

refers to the light that enters the liquid crystal via the first polarizer and the light that enters the light-receiving means represented by the functional box 4 after being reflected and passing through a second polarizer 3. No step is missing. The “rotational light receiving means”, as also discussed above, relates to a rotational adjustment of axes, e.g. by rotating the transmission axis of the first polarizer or rotating the stage 7. The rotating is distinct from the light entering, not a substep. During a time zone included in the period of time where light receiving is carried out by box 4, either the polarizer(s) 2, 3, or stage 7 is rotated concurrently with the light receiving, and this rotating is the “rotational light receiving” step. Claims 19 and 27 have been amended with the addition of the phrase “concurrently with said light-receiving step” to make this relationship explicit.

In response to the Examiner’s comment that the rotary stage is omitted from claim 27, as noted above, the rotary stage is not omitted – it is one embodiment of the “rotational light receiving means”.

As to claim 33, applicants note that “reflection type” is both a well-defined term in the art, and is defined in the present specification. The term is used in contra-distinction to “transmission-type” defined and discussed on pages 1 and 2 of the specification. Then on page 2, beginning at line 9, the specification explicitly states, with reference to a reflection-type cell shown in Fig. 22, that “a reflector 15 is disposed within the liquid crystal cell 101”.

Further,

“[i]n reflection-type color liquid crystal display 113, light is reflected by reflector 15 within liquid crystal cell 101, which is different from conventional reflection-type liquid crystal display 112 in which light transmitted through liquid crystal cell 100 is reflected after it completely exits from the liquid crystal cell.

Further, in reflection-type liquid crystal displays 112 and 113, light passes through the same liquid crystal layer 11 twice, so that the thickness of liquid crystal layer 11 has greater effects on the display quality, compared to that of a transmission-type liquid crystal display.”

The specification therefore both shows and defines in words “reflection-type”. Applicant urges that there is no ambiguity, and the Section 112, second paragraph, rejection of claim 33 should be withdrawn.

In view of the foregoing amendments and remarks, and in view of the accompanying corrected Fig. 1, applicant urges that the application is in conditions for allowance.

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Respectfully submitted,

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FIG.1

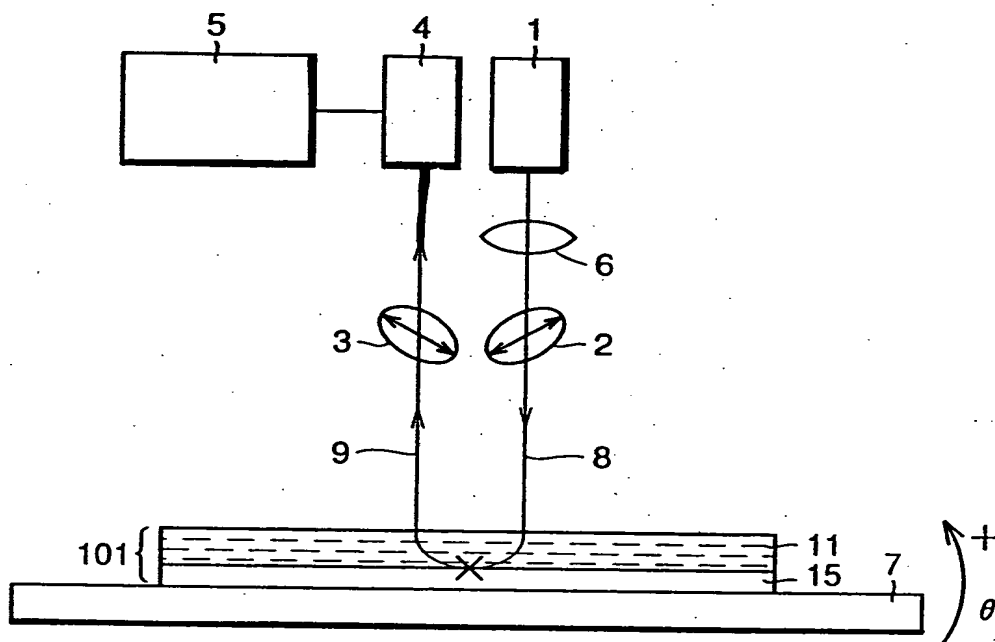


FIG.2

